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Mapping Services Branch, Natural Resources Canada

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Summary

The Mapping Services Branch of the federal Department of Natural Resources is mandated to map Canada. As the national mapping agency, MSB provides Canadians with topographic and toponymic information that contributes to the enhancement and the protection of the country and of its resources. The Branch accomplishes this in part by producing topographic maps and data at the 1:50 000 and 1:250 000 scales. MSB also provides the aeronautical information essential to the safety and efficiency of aviation in Canada and provides cartographic and printing services to the Government of Canada.

With the implementation of ISO 9001 Quality Systems throughout the Branch, monitoring client satisfaction has become an integral part of the process. The analysis component of the system enables management to make decisions based on client and stakeholder responses. While the Branch is clearly a product and service oriented organisation, it must invest in science and technology to allow effective and efficient processes and products to be developed and implemented. As in all activities, partnerships are encouraged in conducting S&T. MSB has continued to work with academia on a wide array research and developmental projects.

Through the development of a national geospatial data infrastructure called GeoConnections, Mapping Services Branch has joined other federal, provincial, territorial and private sector partners in providing better geospatial information to Canadians. The Branch's participation in GeoConnections related activities/projects included: the organisation of the 1st working group on integration tools for multi-sources of data; the negotiation and the implementation of a federal-provincial nation wide Landsat 7 orthoimage project; the co-chairing of the Framework Data Advisory Node of GeoConnections; and, a continued participation in many other nodes: Access, GeoInnovations, Transportation and Roads Applications, Sustainable Communities, Technology, Policy and Standards, and Emergency-Disaster Response.

Other areas of partnership with institutions from all sectors included an agreement with the Canadian Forest Service to digital elevation models over most populated areas of the Canadian landmass; an expansion of its traditional collaborative work with the Department of National Defence to the production of Vmap1 libraries and JOG products, the Y2K Preparedness Project and a joint emergency mapping response program; an agreement with other federal partners for the establishment of a common electronic Canadian Road Network; an agreement with the Canadian Association of Research Libraries, the Association of Canadian Map Libraries and Archives and the university partners participating in the GEOIDE Network of Centres of Excellence to promote and facilitate the use of Canadian digital topographic data for education and research in Canada; and, co-operative arrangements with Transport Canada and NAV Canada to explore new ways of make digital aeronautical products available to all Canadians.

The Branch contributed to the growth of the Geomatics industry by continuing the contracting out of its activities. MSB's partnership with the private sector through their combined expertise and capabilities in modern mapping technologies is also helping the development of the Canadian industry capabilities both at home and abroad.

The year 1999-2000 has also been an introspective as well as a prospective period for Mapping Services Branch as it developed outreaching new visions for its various lines of business. New products and projects targeting a greater audience or specialised segments of the general population have been developed. The Branch has taken a leadership role developing a strong case for reinvesting in upgrading the quality of the national base of geographic information. We are in the process of converting the last of our major aeronautical products to digital production procedures. The benefits of this include improved product quality, quicker production and revision times, new formats and new product spin-offs. The type and quality of aeronautical charts and data available have been expanded for existing clients and to new ones.

As a part of Natural Resources Canada, the Earth Sciences Sector is mandated to map Canada. The Mapping Services Branch (MSB) provides Canadians with topographic and toponymic information that contributes to the enhancement and the protection of the country and its resources. It accomplishes this in part by producing topographic maps and data at the 1:50 000 and 1:250 000 scales. MSB also provides the aeronautical information essential to the safety and efficiency of aviation in Canada and provides cartographic and printing services to the Government of Canada.

While the Branch is clearly a product and service oriented organisation, it must invest in science and technology to allow effective and efficient processes and products to be developed and implemented. Science and Technology (S&T) is planned, co-ordinated and monitored through the Branch's S&T committee. As in all activities, partnerships are encouraged in conducting S&T.

MSB has been monitoring client and stakeholder requirements through surveys, focus groups and interviews. This has been done in an ad hoc fashion in the past but with the implementation of ISO 9001 Quality Systems throughout the Branch, monitoring client satisfaction has become an integral part of the process.

Monitoring systems with an analysis component enables management to make decisions based on client and stakeholder responses

GeoConnections

Through the development of GeoConnections, Mapping Services Branch has joined other federal, provincial, territorial and private sector partners in providing geospatial information to Canadians. The Branch's participation in GeoConnections related activities/projects included: the organisation of the 1st working group on integration tools for multi-sources of data; the signing of an agreement between Canada Centre for Remote Sensing and the Centre for Topographic Information for the production of a complete set of ortho-images covering the Canadian landmass from Landsat 7 satellite images. Agreements are in place with all provincial and territorial agencies and with 12 federal departments to acquire the images and use the best control available to rectify the images. The ortho-image coverage will allow the creation of a common geographic reference base that will entail the updating of digital topographic data and make a new nation wide satellite product available at low cost. The Director General of MSB is also co-chair of the Framework Data Advisory Node of GeoConnections and Branch employees continue to participate in many other nodes: Access, GeoInnovations, Transportation and Roads Applications, Sustainable Communities, Technology, Policy and Standards, and Emergency - Disaster Response.

Working with industry

Mapping Services Branch contributed to the growth of the Geomatics industry by continuing its contracting out activities to the value of $3.4 M for 1999-00. The Branch is also actively involved in the field of international business development. The four most important international projects for 1999-00 were:

- the completion of a 3-year project to produce 900 maps for the City of Riyadh in Saudi Arabia in partnership with Terra Surveys Ltd.
- the production of Joint Operation Graphic (JOG) charts for the United States National Imagery and Mapping Agency (NIMA)
- the initiation of geospatial data infrastructure project in Tunisia in cooperation with the Canadian International Development Agency (CIDA) and other private partners
- also in cooperation with CIDA and private partners, the implementation of a mapping projects in support of a major de-mining program in Mozambique

MSB's partnership with the private sector through their combined expertise and capabilities in modern mapping technologies is helping the development of the Canadian industry capabilities both at home and abroad..

Working with academia

Mapping Services Branch continues to work with academia on the various subjects and projects:

- with Carleton University on
  - providing training as part of a project on Internet cartography for the Americas
  - use of digital cameras for mapping and DEM generation
  - geospatial information and processing and electronic atlases for sustainable development – cyber cartography for Americas. PAIGH project in co-operation with several Latin American Universities
  - Internet base cartographic iconography
- with Calgary University on
  - tactile mapping
  - data fusion
- with Laval University on
  - Radarsat satellite imagery on the data alignment layer
  - defining the Topograf model (next generation of the National Topographic DataBase)
  - digital frame camera systems (in co-operation with Ryerson University)
  - heterogenous data fusion within an interoperability context
- with Hull University on
  - Internet based cartographic visualisation

- with Sherbrooke University
  - high resolution imagery and radar
  - automation for change detection, feature extraction and feature classification
  - high resolution satellite imagery processing for automatic feature detection

Partnerships

Mapping Services Branch is continually building other partnerships with other federal agencies or with academic institutions.

- In August 1999, an agreement was signed with the Canadian Forest Service to produce, over a five-year period, 3000 digital elevation models from the National Topographic Data Base at 1:50 000 scale covering the most populated areas of the Canadian landmass. An extension of the original program is being considered under GeoConnections.
- MSB is expanding its collaborative work with the Department of National Defence on various projects: the acquisition of topographic data, paper maps, aeronautical and toponymic information; and the production of Vmap1 libraries and JOG products. An agreement is in preparation for a joint emergency mapping response program. The proposed agreement combining the expertise of both federal agencies is a logical follow-up to the joint efforts expended in the Y2K Preparedness Project.

- The Mapping Services Branch has signed agreements with other federal partners (Elections Canada, Statistics Canada) for the establishment of a common electronic Canadian Road Network; since then, other provincial agencies and private geomatics companies have signed agreements with the Centre for Topographic Information in Sherbrooke to help update the Canadian Road Network.
- The Branch also promotes easier access to topographic data by academia; an agreement was signed in August 1999 with the Canadian Association of Research Libraries and the Association of Canadian Map Libraries and Archives to promote use of digital topographic data of Canada for education and research in Canadian educational institutions. An agreement signed in March 2000 promotes access to topographic data to a larger public and at a lower cost for university partners participating in the GEOIDE Network of Centres of Excellence.

New visions

The year 1999-00 has also been an introspective period for Mapping Services Branch.

- The Centre for Topographic Information in Sherbrooke (CTIS - database side of the organisation) has developed a new vision for digital topographic information which results into the new topographic data base Topograf, well

aligned with GeoConnections' goals, and that will provide a consistent, accurate, reliable and up-to-date digital topographic representation of the Canadian landmass. The concepts of the data collected once and used by many, of single geometry and of distributed data bases shared among a network of collaborators is at the heart of the vision being pursued. CTIS has continued to implement further their announced strategy to monitor, investigate and adopt mainstream standards and technology. Sale price of digital files has been significantly reduced and a new policy on data access through subscriptions has been implemented.

- The Centre for Topographic Information in Ottawa (CTIO - cartographic side of the organisation) had started their visioning process and an impact study of topographic maps was conducted to determine areas of priority and their socio-economic benefits. The distribution of the conventional map products is handled through a network of Regional Distribution Centres. One new distributor was added in British Columbia for a total of 17 distributors in place. Adjustments were made to various aspects of the distribution policy such as price, discount level and handling and shipping costs. Sale price of toponymic digital files has been reduced.
- In 1999-00 Aeronautical and Technical Services (ATS) had been successful in obtaining the subscriptions of major stakeholders, DND and Transport Canada, and in and in 2000-2001 digital aeronautical charts and custom produces with NavCanada

- CTIS and ATS have successfully renewed their compliance to the ISO 9000 Quality Management System and CTIO achieved compliance.
- ATS has been selected as a trophy winner of the National Quality Institute's, Canada Awards for Excellence. ATS is the first government organization to earn this world class recognition.

New products/projects

In 1999-2000, new products and projects targetting a greater audience or a specialized segment of the general population have been developed in Mapping Services Branch.

- A commemorative map of Iqaluit was produced economically and in a short time frame using new raster technology; a framed copy of the map was presented to the Mayor of Iqaluit in July 1999 and media representatives were present for this event. Over 125 copies of the map were later sent to all classrooms in Iqaluit.
- For the 1999 ICA Conference, ATS in conjunction with the National Aviation Museum created the largest Canadian aeronautical chart ever made; the 7 X 10 meter chart was printed on flooring material and is part of the exhibit at the National Aviation Museum.
- A *Tactile Atlas of Canada* was produced following research on maps for blind and visually impaired people and is being used in schools; map prototypes

were presented at the Canada Trade Show on Canadian Technologies for Disabled and at the ICA Conference, and later tested in schools for the blind which resulted in tangible requests for atlases by these institutions.

- In December 1999, CTIS released on Internet and free of charge Toporama, an image representation of the National Topographic Data Base at the 1 :250 000 scale. Toporama meets the demands of the general public and geomatics or mapping experts for cartographic representation for use in a wide range of applications (office automation, tourism, mapping, etc.).
- CTIO has developed a new way of producing rasterized versions of topographic maps that display the newest topographic information; produced in a very cost effective way, the maps have a superior quality and are primarely used as a backdrop or base layer for other information and can be distributed electronically on a soft copy format along with the conventional paper maps.
- Aeronautical and Technical Services implemented the AeroD extranet for Transport Canada, DND, NAV CANADA and Transportation Safety Board. These organizations are able to get digital copies of current and past aeronautical information publications and charts digitally and to make geographically based queries to an aeronautical data base to find information. This kind of implementation is the first of its kind in the world.

The future

CTI is taking a leadership role in working with other Geomatics Canada Branches and Divisions to develop a strong case for reinvesting in geographic information. The impact on the Canadian economy of geographic information, including maps, will be assessed as will the effect of the present access and Intellectual Property policies.

With Topograf, a range of more current and accurate digital topographic products will become available. There will also be a better alignment to privileged, specialised, mass market and emergency response clients; we anticipate an increase in use of topographic data although revenues may be stable as prices for digital products are expected to continue to decrease.

Aeronautical Charts is in the process of converting the last of its major products, the VFR Navigation Charts (VNC) series, to digital production procedures. The benefits of this include improved product quality, quicker production and revision times and new product spin-offs and new formats.

AeroD is expanding the type and quality of aeronautical charts and data available to existing and new clients a key initiative in ensuring that ATS remains Canada's leading supplier of aeronautical charts.

ATS is exploring ways to make digital aeronautical products available to all Canadians through cooperative arrangements with Transport Canada and NAV CANADA. Working with NAV CANADA's Flight Information Centre (FIC) initiative, this project could provide one stop shopping for the aviation community for charts, publications, weather and flight planning services. This would add to the efficiency and safety of aviation in Canada.